

June 20, 2022

U.S. Department of Transportation, Docket Operations
West Building Ground Floor, Room W12-140
1200 New Jersey Avenue, SE
Washington, DC 20590

Re: Petition for Exemption Under Part 11 of the Federal Aviation Regulations from 14 CFR §§ 107.36; 137.19(c), (d) and (e)(2)(ii), (iii), and (v); 137.31(a) and (b); 137.33(a) and (b); 137.41(c); and 137.42.

PETITION FOR EXEMPTION

Dear Sir or Madam:

The Hawaii Agricultural Research Center (HARC) petitions for an exemption from the listed Federal Aviation Regulations ("FAR's") to conduct agricultural aircraft operations. The authority for the FAA to grant this petition is from 14 C.F.R. Part 11.

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I. QUICK REFERENCE SUMMARY

- The operations will be conducted under Part 107 for agricultural aircraft operations.
- The aircraft will be the E616S Hexacopter made by Effort Tech (EFT).
- In support of this petition, the Petitioner will submit the following associated operating documents:
 - HARC Flight Operations Manual
 - E616S Agriculture Drone Frame User Manual
 - Jiyi K++ Flight Controller User Manual
 - Siyi AK28 Remote Control User Manual
 - Agri Assistant App User Manual
 - CTAHR Aerial Pesticide Application Booklet
 - Supplement to CTAHR Aerial Pesticide Application Booklet
 - HARC Drone Pilot Training Manual
 - HARC Pesticide Drone Pilot Evaluation
- The Petitioner is proposing to operate under the restrictions similarly listed in Exemption # 17261, listed in a section below, which will provide an equivalent level of safety as the burdensome regulations.

II. BACKGROUND OF PETITIONER

With over 125 years of experience serving the State of Hawaii, the mission of the Hawai'i Agriculture Research Center (HARC) is: To support a viable agriculture and natural resource sectors by researching and applying relevant science and technology to achieve practical solutions and identifying new agricultural opportunities.

Specially, HARC, in collaboration with the USDA Forest Service and the State of Hawaii DLNR-DOFAW, operates an *Acacia koa* (Koa) tree improvement program and seed orchards. The program has made significant progress developing Koa wilt (*Fusarium oxysporum*) resistant populations. This fungus which causes Koa wilt, is a serious and often fatal disease of Koa. Further, Koa seed is heavily predated by several insect pests (*Araecrus levipennis*, *Stator limbator*, and *Cryptophlebia illepida*) often resulting in losses exceeding 75%. Development of a disease-resistant Koa seed stock is important both economically and socially, as Koa wood is valuable and highly regarded in woodworking and Hawaiian culture.

HARC is partnering with Island UAV LLC, a Hawaii-based UAS service provider, to develop a safer, more efficient, and more effective way to apply insecticides for the protection of Hawaiian Koa seed orchards in Hawaii. The purpose of this intended operation is to increase the production of viable Koa seeds for landscape scale reforestation and restoration projects.

The pilot in command (PIC) will be Island UAV LLC owner/operator Derek Ford. Derek is an expert in UAS technology and geospatial science, specifically geared towards natural resource management and agricultural applications. He has a master's degree in Geography with a focus on the use of UAS technology for monitoring vegetation and has professional experience with pesticide applications in both natural and cropland environments. Derek has held the Remote Pilot Part 107 UAS license continuously since 2017. He conducts UAS operations for environmental groups, scientific researchers, and engineering companies, and also provides UAS education and staff training.

III. THE REGULATIONS WHICH THE PETITIONER IS REQUESTING EXEMPTION FROM

- 14 C.F.R. § 107.36
- 14 C.F.R. § 137.19(c) and (d)
- 14 C.F.R. § 137.19(e)(2)(ii), (iii), and (v)
- 14 C.F.R. § 137.31(a) and (b)
- 14 C.F.R. § 137.33(a) and (b)
- 14 C.F.R. § 137.41(c)
- 14 C.F.R. § 137.42

IV. EXTENT OF RELIEF THE PETITIONER IS SEEKING

The Petitioner proposes these restrictions and believes that these limitations provide an equivalent level of safety, if not greater, as the FAR's presently impose upon the Petitioner. Each of the regulations above will be talked about in greater detail in another section in this petition.

These limitations and conditions are equal to Exemption # 17261 except as noted below. The list of limitations and conditions include the following:

1. Operations authorized by this grant of exemption are limited to any model small UAS as long as the UAS being flown has a take-off weight of less than 55 pounds, even though maximum take-off weight capability may be higher.

NOTE: Exemption 17261 granted to Drone Seed, Co. had for restriction 1 "Operations authorized by this grant of exemption are limited to any model small UAS with a maximum take-off weight of less than 55 pounds." We changed this to the above to clarify that the drone being flown must weigh below 55 lbs. at the time of takeoff. This is important because some unmanned aircraft have the capability to fly over 55 pounds (they have higher maximum take-off weights). Our rephrased restriction is in line with 107.3 which says, "Small unmanned aircraft means an unmanned aircraft weighing less than 55 pounds on takeoff, including everything that is on board or otherwise attached to the aircraft." See also Section 331 of the FAA Modernization and Reform Act of 2012.2 Additionally, this allows the petitioner greater flexibility in choosing aircraft without having to come back and amend the exemption; thus, saving FAA resources. The rest of the restrictions in this exemption are identical to 17261.

2. When adding any small UAS or new small UAS models that will be operated under this exemption, the operator must notify the Flight Standards District Office (FSDO) which holds their operating certificate. Additionally, operations authorized by this exemption are limited to the small UAS listed on the operator's part 137 Letter of Authorization (LOA).

3. This exemption and all documents needed to operate the small UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the Conditions and Limitations in this exemption, any applicable FAA issued waivers /authorizations, and the procedures outlined in the operating documents, the most restrictive conditions, limitations, provisions,

or procedures apply and must be followed. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The General Aviation and Commercial Division, (AFS-800) may be contacted if questions arise regarding updates or revisions to the operating documents.

4. Any small UAS used by the operator that has undergone maintenance or alterations that affect the small UAS operation or flight characteristics, e.g. replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a remote PIC with a Visual Observer (VO) and other personnel necessary to conduct the functional flight test (such as a mechanic or technician). The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

5. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

6. PIC qualifications: The remote PIC must demonstrate the ability to safely operate the small UAS in a manner consistent with how it will be operated under this exemption, including the applicable knowledge and skills requirements for agricultural aircraft operations outlined in 14 CFR part 137, evasive and emergency maneuvers, and maintaining appropriate distances from persons, vessels, vehicles and structures before operating non-training, proficiency, or experience-building flights under this exemption.

7. For small UAS operations where Global Positioning System (GPS) signal is necessary to safely operate the small UA, the remote PIC must immediately recover/land the small UA upon loss of GPS signal.

8. If the remote PIC loses command or control link with the small UA, the small UA must follow a pre-determined route to either re-establish link or immediately recover or land.

9. The remote PIC must abort the flight operation if unpredicted circumstances or emergencies that could potentially degrade the safety of persons or property arise. The remote PIC must terminate flight operations without causing undue hazard to persons or property in the air or on the ground. Documents the operator must retain under §§ 107.13, 137.33, and in accordance with this exemption (including but not limited to: operators exemption, any waiver held, a facsimile of the agricultural aircraft operator certificate, training manual, operations manual, and registration certificate) must be available to the remote PIC at the Ground Control Station of the small UAS at all times the aircraft are operating. These documents must be made available to the Administrator or any law enforcement official upon request. Airworthiness certificates applicable to the small UAS to which this exemption applies are not required for compliance with this condition.

10. The relief granted from § 107.36 is limited to the use of any economic poison as defined in § 137.3.

11. The remote PIC may operate the small UAS from a moving device or vehicle as described in § 107.25, which permits such operation in sparsely populated areas, provided the small UAS do not transport property for compensation or hire. If conducting agricultural aircraft operations in accordance with § 107.25, the remote PIC must satisfactorily demonstrate the applicable knowledge and skills requirements of § 137.19 in the type of device or vehicle to be used in agricultural aircraft operations.

12. This exemption will not be valid for operations outside of the United States.

V. REASONS WHY THE PETITIONER IS SEEKING RELIEF FROM THE REGULATIONS AND WHY THE EXEMPTION WOULD PROVIDE AN EQUIVALENT LEVEL OF SAFETY

A. 14 C.F.R. § 107.36 Carriage of hazardous material

Section 107.36 says, “A small unmanned aircraft may not carry hazardous material. For purposes of this section, the term hazardous material is defined in 49 CFR 171.8.” Some of the chemicals that need to be dispensed during the agricultural aircraft operations may be classified as hazardous material. Because this regulation is not waivable under 107.205, we are requesting an exemption from it.

An equivalent level of safety can be achieved by requiring the Petitioner to obtain a FAA agricultural aircraft operator certificate prior to operations, use pilots who have a remote pilot certificate, fly aircraft weighing less than 55 pounds (limiting the amount of hazmat being carried), follow any and all restrictions placed on the agricultural aircraft operator certificate, and limit the hazardous material being carried to only economic poisons.

The requirement to use only FAA-certificated remote pilots also alleviates any security concerns as the TSA would have already done a background check on the individual possessing the pilot certificate.

B. 14 C.F.R. §§ 137.19(c), 137.41(c) Pilot in command

Section 137.19 paragraph (c) says, “Commercial operator—pilots. The applicant must have available the services of at least one person who holds a current U.S. commercial or airline transport pilot certificate and who is properly rated for the aircraft to be used. The applicant himself may be the person available.” Section 137.41 paragraph (c) references back to 137.19.

These regulations are extremely burdensome and unnecessary. As found in the previously granted exemptions, an equivalent level of safety of the regulations can be achieved by requiring a remote pilot certificate, operations to be done in accord with Parts 107 & 137, an agricultural aircraft operations certification be obtained prior to operations, and the proposed restrictions in this exemption.

C. 14 C.F.R. § 137.19(d), 137.31(a) and (b) Certification and Aircraft

Section 137.19 paragraph (d) says, “The applicant must have at least one certificated and airworthy aircraft, equipped for agricultural operation”, and section 137.31 (a) references back to 137.19 (d). Small unmanned aircraft operated under Part 107 do not have any aircraft certification requirements. Under Part 107, the remote pilot in command is responsible for

determining if the aircraft is airworthy. The requirements contained in the manufacturer's manuals, the requirement in Part 107 for the remote pilot to conduct pre-flight inspections of the aircraft, and the requirement of the agricultural aircraft operator certificate be obtained prior to flight will be in total sufficient for determining the airworthiness of the aircraft which provides an equivalent level of safety as the regulations for agricultural aircraft operations. Moreover, the Petitioner is the one best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety as the regulations.

Section 137.31 paragraph (b) requires an aircraft to be equipped with a suitable and properly installed shoulder harness for use by each pilot. This requirement is intended to ensure the safety of the onboard pilot during manned agricultural aircraft operations and thus, relief from this requirement does not adversely impact safety.

D. 14 C.F.R. § 137.19(e)(2)(ii), (iii), and (v) Skills Test

Section 137.19 paragraphs (e)(2)(ii), (ii), and (v) are unnecessary and not applicable for small unmanned aircraft. As the FAA stated in Exemption 17261, "the FAA has determined that demonstration of the skills described in these paragraphs is not necessary because they are not compatible or applicable to" agricultural aircraft operations with multi-rotor unmanned aircraft. Therefore, relief should be granted to agricultural aircraft operations which utilize only small UAS.

An equivalent level of safety can be obtained by requiring the remote pilot to have a valid remote pilot certificate, requiring the Petitioner to obtain prior to operations an agricultural aircraft operations certificate, and requiring that operations must be done under the proposed restrictions of this petition.

E. 14 C.F.R. § 137.33 (a) and (b) Carrying of certificate

Section 137.33 paragraph (a) requires the agricultural aircraft operator certificate be carried on the aircraft. Additionally, paragraph (b) requires the airworthiness certificates to be available for inspection at the base.

A similar situation was addressed in the FAA legal opinion letter of Mark Bury to John Duncan on August 8, 2014 where the FAA general counsel's office answered whether registration and airworthiness documents must be carried aboard an unmanned aircraft. Mr. Bury said, "we find that the intent of these regulations is met if the pilot of the unmanned aircraft has access to these documents at the control station from which he or she is operating the aircraft."

Likewise, the Petitioner here proposes to keep the agricultural aircraft operator certificate and registration all at the ground station. These documents can be available for inspection by the FAA or law enforcement. This all provides an equivalent level of safety as the regulations.

Additionally, the Petitioner needs relief from paragraph (b) because operations under Part 107 do not require an airworthiness certificate and it would be extremely burdensome to acquire an airworthiness certificate in order to comply with this paragraph of the regulation. An equivalent level of safety can be reached by requiring the remote pilot to obtain an agricultural aircraft operators certificate prior to operations and conducting pre-flight inspections.

F. 14 C.F.R. § 137.41(c) Pilot in command

Section 137.41 paragraph (c) says, “No person may act as pilot in command of an aircraft unless he holds a pilot certificate and rating prescribed by §137.19 (b) or (c), as appropriate to the type of operation conducted. In addition, he must demonstrate to the holder of the Agricultural Aircraft Operator Certificate conducting the operation that he has met the knowledge and skill requirements of §137.19(e). If the holder of that certificate has designated a person under §137.19(e) to supervise his agricultural aircraft operations the demonstration must be made to the person so designated.”

An exemption is needed from this regulation based upon the same reasons listed above for Section 137.19 (c) and for Section 137.19(e)(2)(ii)-(v). An equivalent level of safety can be provided by the proposed restrictions listed herein that have already been determined by the FAA in Exemption 17261 to provide an equivalent level of safety as the regulations. Additionally, all pilots in command will obtain a remote pilot certificate and have passed company training.

G. 14 C.F.R. § 137.42 Fastening of safety belts and shoulder harnesses

Section 137.42 says, “No person may operate an aircraft in operations required to be conducted under part 137 without a safety belt and shoulder harness properly secured about that person except that the shoulder harness need not be fastened if that person would be unable to perform required duties with the shoulder harness fastened.”

This regulation is designed to protect people on board the aircraft. Since there are no people on board, whether we follow it or not, the impact on safety is the same. However, because the law requires it, we require an exemption from this regulation. Therefore, an equivalent level of safety can be achieved by flying under the proposed restrictions herein.

VI. REASONS WHY GRANTING THIS PETITION WOULD BE IN THE PUBLIC INTEREST

If the Petitioner does not have the option of using the Petitioner’s unmanned aircraft (UA), the only other ways to spray the ground areas are by using manned aircraft, mobile spraying rigs, or on foot by hand operated equipment. Some of these other options are not as safe, cost-effective, or time efficient as unmanned aircraft. Allowing the Petitioner to use the UA gives the Petitioner more options when selecting the best tool for the given location and operation. UA can be extremely precise and allow for the precise application of economic poisons. UA can also be rapidly deployed to inaccessible areas which enables the Petitioner to rapidly combat problems. The UA have multiple motors while most manned aircraft have only one engine; thus, there is some motor redundancy for some UA in case of a motor malfunction. Lastly, the UA will be operated at lower altitudes than most manned aircraft. This vertical separation greatly reduces the chance of a mid-air collision.

VII. FEDERAL REGISTER SUMMARY

As required by 14 C.F.R. Part 11, below is provided a summary of the petition to be published in the Federal Register should it be determined that publishing is needed.

The Petitioner is seeking an exemption from the following rules:

14 C.F.R. §§ 107.36; 137.19(c) and (d); 137.19(e)(2)(ii), (iii), and (v); 137.31(a) and (b); 137.33(a)

and (b); 137.41(c), and 137.42 to operate an unmanned aircraft, weighing less than 55 pounds, commercially for agricultural aircraft operations as defined in 14 C.F.R. § 137.3.

This exemption is needed because the listed regulations are extremely burdensome to operate under while conducting agricultural aircraft operations under the Federal Aviation Regulations. The proposed restrictions contained in the petition and manuals will provide an equivalent level of safety as the regulations.

VIII. OPERATING DOCUMENTS

The petitioner will operate only within the limitations above and any limitations listed in the manufacturer's manuals. Additionally, the remote pilots operate under the company's flight operations manual. The limitations above, from the previously granted exemption (# 17261), will be followed if there is a conflict with any of the manuals.

IX. STATUTORY AUTHORITY TO GRANT THIS PETITION

The Federal Aviation Act gives the FAA the authority to grant exemptions. "The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any sections 44702-44716 of this title if the Administrator finds the exemption in the public interest."

X. CONCLUSION

The operation of the Hawaii Agricultural Research Center using a small UAS, weighing less than 55 lbs. at take-off, for agricultural aircraft operations, conducted under the proposed restrictions outlined above, will provide an equivalent level of safety as the burdensome regulations; therefore, this petition should be granted without delay. If I can be of any assistance, please do not hesitate to contact me at (808)268-8206 or at my email islanduav@gmail.com.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'DJF', is written over a horizontal line.

Derek James Ford, Owner/Operator Island UAV LLC

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